

Pressure Sensors for Glenn Extreme Environment Rig and Planetary Science Applications, Phase I

Completed Technology Project (2018 - 2019)



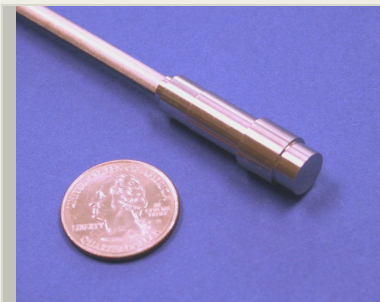
Project Introduction

In-situ instrumentation is needed that can withstand the harsh environments imposed by planetary atmospheres in order to make advancements in solar system exploration. Technologies that can withstand the corrosive/caustic gases, radiation levels, stresses, and high temperatures and pressures, while still producing reliable, real-time data are a major facilitator for planetary missions. To address this need, Sporian is developing a harsh environment pressure sensor targeted toward the Glenn Extreme Environment Rig (GEER) and future Venus probe spacecraft. The proposed technology will be beneficial to NASA's planetary science mission by facilitating, environmental chamber testing/validation, and pressure measurements in the Venus atmosphere and on the surface. The Phase I effort will focus on heavily leveraging prior harsh environment, in-situ instrumentation development and, with input from current/prior NASA partners, construct, test, and characterize prototype sensor suites. If successful, Sporian will be well prepared for Phase II efforts focused on producing full demonstration units for application-relevant testing and addressing integration strategies.

Anticipated Benefits

A harsh environment sensor that can provide real-time pressure information has the potential to provide major advancements in planetary science. The technology will target the Glenn Extreme Environment Rig and its capability to mimic planetary conditions such as those on Venus, but be directly applicable to both current and future NASA programs/directorates, and facilitate innovations in vehicle performance monitoring, environmental testing, and atmospheric characterization of planetary bodies.

Aero propulsion turbine engines, commonly used in commercial and military jets, would benefit significantly by having a non-invasive, small mass, on engine pressure sensor allowing for visibility of the conditions in the turbine engine. Additional potential market areas include: marine propulsion, rail locomotives, land based power generation turbines, automotive, oil and gas refining, nuclear power generation, concentrating solar power systems, and government and academic laboratories.



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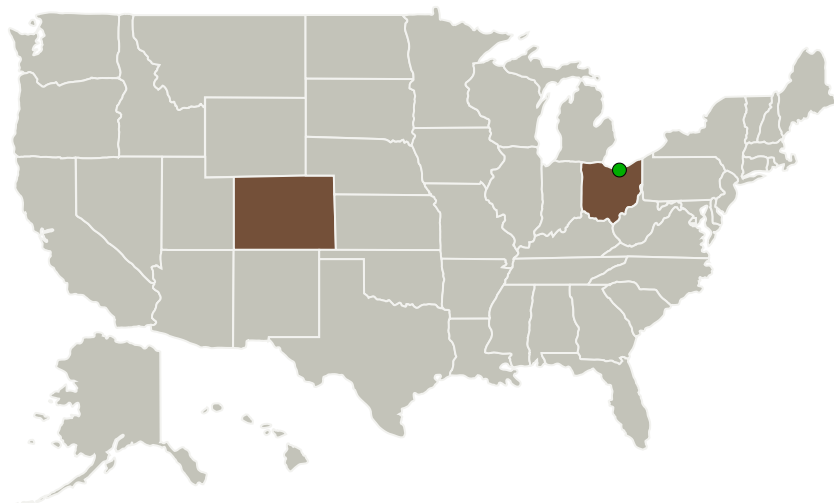
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Primary U.S. Work Locations and Key Partners




Organizations Performing Work	Role	Type	Location
Sporian Microsystems, Inc.	Lead Organization	Industry	Lafayette, Colorado
● Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations

Colorado	Ohio
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Project Transitions

 **July 2018:** Project Start

 **February 2019:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/141239>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Sporian Microsystems, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Kevin Harsh

Co-Investigator:

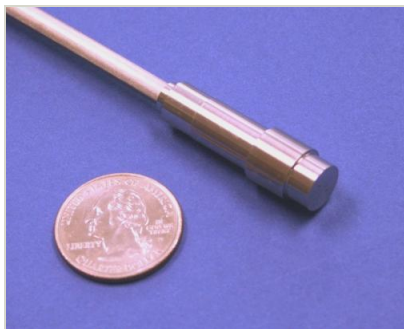
Kevin Harsh

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Images



Briefing Chart Image

Pressure Sensors for Glenn Extreme Environment Rig and Planetary Science Applications, Phase I

(<https://techport.nasa.gov/image/126961>)



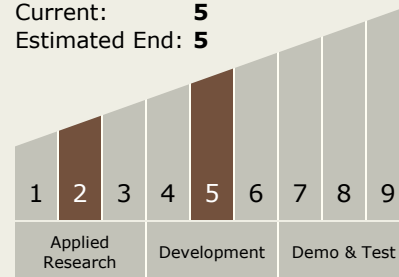
Final Summary Chart Image

Pressure Sensors for Glenn Extreme Environment Rig and Planetary Science Applications, Phase I

(<https://techport.nasa.gov/image/136111>)

Technology Maturity (TRL)

Start: 2
Current: 5
Estimated End: 5



Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.4 Microwave, Millimeter-, and Submillimeter-Waves

Target Destination

Others Inside the Solar System